

# Waiting for the wet: out-of-season records for adult Leichhardt's Grasshopper *Petasida ephippigera* (Orthoptera: Pyrgomorphidae)

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## Abstract

A number of adult Leichhardt's Grasshopper *Petasida ephippigera* White, 1845, were recorded in July, about two months earlier in the year than they are usually observed. This early adult phenology may have been the result of unusually high rainfall experienced during the preceding wet season. It was also noted that all developmental stages of Leichhardt's Grasshoppers were more often found on less vigorous shrubs of their food plants, *Pityrodia* spp.

## Introduction

The brightly-coloured Leichhardt's Grasshopper *Petasida ephippigera* (Figure 1) is a striking insect of the Top End, though few people have actually seen it in the wild. The species occurs in scattered localities north of 16°S in western and northern Arnhem Land and in the eastern Kimberley-western Victoria River District (Calaby & Key 1973; Lowe 1995; Wilson *et al.* 2003). Leichhardt's Grasshopper usually lives in close association with various species of *Pityrodia* (Lamiaceae) that comprise its main food plants, but it has also been found in association with *Gardenia* (Rubiaceae) and *Dampiera* (Goodeniaceae) (Key 1985).

Available information on the life cycle of Leichhardt's Grasshopper indicates that eggs hatch early in the dry season and adults mature by the onset of the wet season (Key 1985). Juveniles have been recorded from May to November, while adults have been recorded from September to April.

## Observations

During the past three years (2009-2011) intermittent observations were made along the Barrk Walking Track at Nourlangie Rock in Kakadu National Park. Leichhardt's Grasshoppers were found at three sites along this track on the sandstone plateau. At the first site, the only observation was of a single adult female in January 2009, although the site contained an extensive patch of *Pityrodia jamesii*.

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**Figure 1.** The brightly-coloured Leichhardt's Grasshopper *Petasida ephippigera* on its food plant *Pityrodia jamesii*. (M.F. Braby)

At the second site, only a single juvenile was sighted, in July 2011. This individual was an early instar nymph that was located on *P. jamesii*. Only a few of these food plants were present at the second site, and all were small in stature.

At the third site, Leichhardt's Grasshoppers were observed on every visit, except for one occasion in June 2009. Nymphs were usually present in the dry season, while adults were recorded mainly in the wet season (December-April); however, during the 'build-up' both juveniles and adults were present. The third site had an abundance of large *P. jamesii*, but Leichhardt's Grasshoppers were never found on these plants. Instead, they were always found on a smaller and apparently different species of *Pityrodia*, most likely *P. puberula* (P. Barrow & D. Franklin, pers. comm.). During June

2009, all the *P. puberula* plants at this site were withered and appeared dead, although they recovered later in the season. However, a number of juveniles and some adults were present at the third site when I visited the area during the 'build-up' in October 2009, indicating remarkable resilience to poor food quality.

During a visit to the third site on 31 July 2011, numbers of Leichhardt's Grasshoppers were observed. Most of these grasshoppers comprised early instar nymphs, but surprisingly four adults were present. An adult female and an adult male were on two separate shrubs and a pair was on a third shrub. Each adult was perched on a separate twig of *Pityrodia puberula*. All individuals were in perfect condition, and absence of missing limbs or wing damage suggested that they had moulted recently.

On 1 August 2011, observations were made at a fourth site in Kakadu National Park, along a road about 3 km from Gubara Pools, to ascertain whether any adult Leichhardt's Grasshoppers were present. This site is some distance from Nourlangie Rock and only *P. jamesii* was found there. Large numbers of early instar nymphs were present, as well as two individuals that were more developed. Based on the photographs in Rentz *et al.* (2003), one of the large nymphs appeared to be in the third instar, while the second one appeared to be in the fourth instar. No adults were present at this site.

## Discussion

Leichhardt's Grasshoppers were usually observed on smaller and less healthy-looking specimens of their *Pityrodia* spp. food plants. Vigorously-growing food plants appeared to be avoided. Wilson *et al.* (2003) made similar observations of Leichhardt's Grasshopper nymphs at Nitmiluk National Park.

These findings parallel my own unpublished observations of another grasshopper in the same family, the Southern Pyrgomorph *Monistria concinna* in southern coastal New South Wales. This species was usually found on smaller, unhealthy-looking specimens of its food plant, *Westringia fruticosa*. The Southern Pyrgomorph has been shown to be distasteful to predators (Groeters & Strong 1993). The insects may be deriving something particular from these smaller, unhealthy-looking plants, or these plants may be more palatable to the insects. It would indeed be interesting to investigate this aspect of food plant preference for related Northern Territory species, such as the Torpedo Grasshopper *Parastria reticulata*, the Painted Pyrgomorph *Greyacris picta* and the Blistered Pyrgomorph *M. pustulifera*, as well as for Leichhardt's Grasshopper.

The occurrence of adult Leichhardt's Grasshoppers in July appears to be quite unusual given previous records of the species. The early adult phenology may have been related to the preceding La Niña-induced wet season, during which rainfall was well above average. Jabiru is the nearest location to Nourlangie Rock for which rainfall figures are readily available. These data give an indication of the magnitude of

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the 2010-2011 wet season in the Top End. The Bureau of Meteorology (2011a) gives a long term annual rainfall average of 1,589.40 mm for Jabiru. Rainfall in Jabiru during the most recent wet season (October 2010-April 2011) was 2,422.60 mm (Bureau of Meteorology 2011b). In other words, rainfall during these seven months at Jabiru exceeded the average annual amount by 833.2 mm.

Above-average rainfall and the pronounced wet season may have resulted in a longer growing season for Leichhardt's Grasshopper food plants. This in turn may have resulted in better quality nutrition for the insects, enabling them to mature earlier than usual. The food plants at the third site were certainly in better condition in July 2011 than they were in June 2009, when the plants were withered and appeared dead. Thus, better food quality in 2011 probably allowed adults to mature as early as July, unlike in other years when adults do not normally appear until September or later.

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